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Compliment.

Royal Society  of Victoria.

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ON A NEMATODE FOUND IN THE  
STOMACH OF A COPPER-HEAD  
SNAKE.

(WITH PLATE.)

BY

D. McALPINE, F.C.S.

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ART. VI.—On a *Nematode* found in the Stomach of a  
*Copper-head Snake*.

(With Plate VIII.)

By D. MCALPINE, F.C.S.

[Read June 12, 1890.]

This nematode was found in the stomach of the same snake as was infested with the fluke; it measured about five and a half inches in length, and was of a scarlet colour. Its presence in the stomach may be simply due to the fact that it was taken in with drinking water in the young condition, just as they sometimes enter the human body. Or, the eggs may have entered the alimentary canal through some intermediate host. It lived for several days in water freely exposed to the air, after which it was sent to my friend Dr. Cobb, of Sydney, for identification. He kindly supplied the accompanying drawings on which the following brief description is based:—

The specimen happened to be a female, and since many of the characters depend on the male, it has only provisionally been referred to the genus *Ascaris*.

The size and characteristic scarlet colour have already been mentioned. The body tapers towards each end, and is moderately stout (Fig. 1). The anterior end, of a whitish colour, is terminated by the mouth, which is surrounded by three projecting lips furnished with papillæ (Figs. 7 and 8). These lips are situated as shown in Fig. 6, one directed towards the dorsal surface and provided with two papillæ, and the two other lips sub-median, each with one papilla. The inner margins of the lips are tinged with scarlet, and the space between them is occupied by a shield-like organ (?) likewise coloured scarlet, which however is not shown in the Figure.

The posterior end of the body is rounded off, and near its extremity is the anus, a small transverse slit on the ventral



surface (Figs. 2 and 3). The lateral field is shown both here and near the middle of the body (Fig. 4), and it is seen to widen as the extremity is approached.

The nervous system consists of a ring surrounding the œsophagus, and giving off several nerves to the rest of the body (Fig. 5).

The female sexual apparatus is double, only one side being shown (Fig. 9). The ovary is disposed in longitudinal folds and occupies 37 per cent. of the length of the body. This is succeeded by a seminal receptacle, then a uterus in which eggs were found in the very first stages of segmentation and a vulva or sexual opening a little behind the centre of the body. The eggs are spherical, as shown in Fig. 10.

Finally, a formula is here given for this species, which will supply some necessary particulars for the future systematic placing of this worm.

The nematode formula devised by Dr. Cobb gives in brief compass the various measurements which are characteristic for any species, and indicates at the same time the general form and size of the sexual organs. The formula read from left to right, corresponds to the dimensions from head to tail; and the unit of measurement is not absolute but relative, the length of the worm itself being taken as the standard, and the measurements given in hundredth parts of that length. Thus each number expresses a percentage of the total length of the animal, adult specimens as they appear in profile being always taken. The formula consists of 11 numbers, representing as many dimensions. Ten of these numbers are arranged as fractions, the numerator denoting longitudinal measurements and the denominator giving diameters. The eleventh number at the end is the absolute length of the animal—the standard of measurement. The numbers are always given in the same order, referring to pharynx, nerve-ring, base of neck, vulva, and anus successively, so that the formula is brief yet clear, and comparison is easy with other species.

The formula for the present specimen may be given at first with explanatory names, and we will see how much information is compressed in these eleven numbers arranged in this particular way :—

	Pharynx.	Nerve-ring.	Base of Neck.	Vulva.	Anus.	
Lengths ..	·1	·5	3·6	67 <sup>37</sup>	99·75	= 144 mm.
Diameters ..	·2	·3	·5	1·2	·4	

In the first fraction, referring to the pharynx, the numerator (.1) denotes the distance from the anterior extremity to the base of the pharynx, or buccal cavity, and the denominator (.2) represents the diameter of the body at the base of the pharynx.

In the second fraction, relating to the nerve-ring, the numerator (.5) denotes the distance from the anterior extremity to the centre of the nerve-ring, while the denominator (.3) indicates the body diameter passing through the nerve-ring.

In the third fraction, referring to base of neck, the numerator (3.6) denotes the distance from the anterior extremity to the posterior end of the œsophagus, or base of the neck; or in other words, is the length of the head and neck combined. The denominator (.5) represents the diameter of the body at the point of junction of the œsophagus and intestine, or where the neck joins the body.

In the fourth fraction, relating to the vulva, the numerator (.67) denotes its distance from the anterior extremity, and the denominator (1.2) the diameter of the body there. A further reference is introduced here, placed above and to the right of the numerator, to indicate the percentage of the body occupied by the sexual organs. The number 37 indicates that they occupy 37 per cent. of the entire length of the body, or more than one-third.

In the fifth and last fraction, relating to the anus, the numerator (99.75) denotes its distance from the anterior extremity, and the denominator (.4) the diameter of the body there.

It must be clearly understood that relative dimensions and not absolute measurements are given, for relative and not absolute sizes are of prime importance for systematic purposes. However, if the actual measurements are desired, they may easily be calculated by dividing the body length, 144 mm. by 100, which gives the unit of length for the various parts. This unit is 1.44 mm., and the absolute lengths will be as follows :—

Body length	..	..	144 mm.
Length of head	..	..	..
Length of neck	..	..	..
Length from base of neck to vulva	..	..	..
Length from vulva to anus	..	..	..
Length of tail	..	..	..
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		144.	mm.

The continuous horizontal line of the formula may be regarded as the animal itself, the numerators indicating the dimensions in length at successive stages from the head end, and the denominators showing how the body thins, or thickens at each successive stage.

Summing up the information conveyed by the formula alone, we have a worm 144 mm. long, somewhat cylindrical in form, and from the base of the neck towards the anterior extremity there is a gradual tapering. In the posterior portion of the body, there is a very considerable tapering from the vulva to the anus, as indicated by the comparison of the figures 1, 2, and 4.

The numerators denote that the head is relatively small; that the nerve-ring is situated towards the anterior end of the neck; that the vulva does not occupy a central position in the body, but is situated in the posterior half; and that the anus is almost, but not quite, at the posterior end of the body.

Only one specimen having been met with, and the male unknown, it would be premature to fix the exact systematic position.

NOTE.—The nematode formula of Dr. Cobb is fully explained in *Ag. Gaz. N.S.W.*, vol. I, part I, p. 131.

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#### EXPLANATION OF PLATE.

All drawn with the camera, except ovary in Fig. 9, which is sketched in.

1. *Ascaris* sp. (?)
  2.       "       profile, posterior extremity.
  3.       "       ventral view of posterior extremity.
  4.       "       near middle, showing width of lateral field.
  5.       "       oesophagus and nerve-ring.
  6.       "       lips and papillæ (p).
  - 7 and 8. "       lips.
  9.       "       ♀ sexual organs, one branch only shown.
  10.      "       eggs (spherical).
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